

Interdisciplinary Strategy and Collaboration: A Case Study of American Research Universities

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Author's Note

The author thanks Karri Holley for her constructive insights on earlier drafts of this work.

Abstract

Institutions face pressure from governmental agencies and industry to support collaborative activity on campus. This research examines two forms of collaboration, interdisciplinary teaching and research, to better understand the strategies and influences fostering such work. Using Kezar and Lester's (2009) model of intra-organizational collaboration, this study analyzes institutional documents such as strategic plans, public speeches, and reports of 21 research universities in the United States. The results identify key factors necessary to support interdisciplinary collaboration in higher education.

Keywords: Collaboration, interdisciplinary, research universities, document analysis

Introduction

A combination of external pressures and the increasingly established benefits of collaboration provide the impetus for institutions to make efforts to support intra-organizational collaborative activity. Particularly pronounced in recent years, outside stakeholders, from grant agencies to accreditation bodies, call for higher education to place greater emphasis on collaboration among various departments and units on campus (Ramaley, 2001). Kanter (1994) cites increased efficiency and effectiveness throughout the institution as a hallmark of a collaborative systemic approach. Higher education traditionally resists such endeavors, which can largely be attributed to the role of departments, disciplinary silos, and bureaucratic administrative structures. Although new organizational structures such as organized research units (ORU) attempt to overcome these historical limitations (Geiger, 2004), barriers continue to exist, discouraging individuals from engaging in cross-unit collaboration.

Only limited application of the extensive scholarly literature on collaboration currently exists (Kezar, 2005). This research draws on organizational studies of collaboration, in particular intra-organizational activity. Much of the organizational literature focuses on specific types of initiatives, as opposed to the more process-oriented approach adopted in this case study. In addition, much of the research focuses on barriers to collaboration, failing to address avenues to move initiatives forward to foster collaborative environments on campus. As Denison, Hart, and Kahn (1996) contend, our understanding of the larger contextual and environmental forces involved in collaboration represents an underexplored area of research. Furthermore, the larger systemic factors that influence organizational behavior in this regard also represent a weakness in the literature (Tjosvold & Tsao, 1989). This study addresses these deficiencies by examining how interdisciplinary strategies as a form of intra-organizational collaboration emerge, develop, and become institutionalized within major research universities.

Organizational collaboration can occur between internal and external stakeholders. Wood and Gray (1991) offer the most accepted definition of collaboration as “a process in which a group of autonomous stakeholders of an issue domain engage in an interactive process, using shared rules, norms, and structures to act or decide on issues related to that domain” (p. 437). Of particular importance in this study is the focus on institutional artifacts that demonstrate the activities related to establishing the shared rules, norms, and structures in support of interdisciplinary initiatives.

Given the increased pressures for interdisciplinary research, this study considers the organizational responses of 21 American universities defined by the Carnegie classification as research institutions with very high research activity (Walters, 2006). This work seeks to determine what strategies research universities employ to support collaborative interdisciplinary research efforts through the study of institutional texts. The goal is to identify patterns of similarity or difference among these institutions, focusing the strategies of universities that support interdisciplinary efforts as a vehicle to better understand how institutions develop collaboration among internal units. The following research question guides this work: How do interdisciplinary strategies as a form of intra-organizational collaboration emerge, develop, and become institutionalized?

This research expands on Kezar and Lester's (2009) model of organizational collaboration by examining interdisciplinary strategies broadly across more institutions than their original work. This study will provide additional data using their model to understand intra-organizational collaboration and how interdisciplinary innovations emerge, are put into practice, and become institutionalized in major research universities. Interdisciplinarity is defined as the active integration of two or more disciplinary perspectives in the pursuit of a shared problem or topic (Klein, 1990; Lattuca, 2001). The nature of the process of implementing this integration requires collaboration by faculty, administrators, and students. Furthermore, the development of the shared knowledge base requires a collaborative approach to successfully develop a new area of inquiry. Understanding how universities engage in highly innovative and collaborative behavior, in this case, interdisciplinary research, provides insight for institutions seeking to support such activity. By examining the interplay between socially constructed meaning systems (the disciplines), symbolic institutional artifacts (textual documents), and regulation (the perception of organizational priorities), this research seeks to better understand how institutions practice intra-organizational collaboration.

Context for Exploring Interdisciplinary Collaboration

A 2004 report by the National Academy of Sciences identified the most pressing issues and interdisciplinary fields of study awaiting contemporary academics as nanotechnology, genomics and proteomics, bioinformatics, neuroscience, global climate change, conflict, and terrorism (p. 17). Such demands not only presume a wealth of knowledge drawn from across the disciplines, but also collaborative networks of research teams. Pursuit of innovation in these areas fosters collaboration among academics who previously resided within disciplinary boundaries, rarely venturing out to work with other researchers (Holley, 2009). Furthermore, “no single individual will possess all the knowledge, skills, and techniques required” given the complexity of new areas of inquiry (Katz & Martin, 1997, p. 14).

The paradigm shift toward interdisciplinary knowledge results not only in a change for individuals, but also in institutional behavior (Holley, 2009). In recent decades, observers of American higher education have noted an increase in organized interdisciplinary activity (Brint, 2005; Feller, 2004; Klein, 1990; Weingart & Stehr, 2000). Such activity is frequently motivated by external demands from policymakers, funding agencies, and industry partners with the goal of producing knowledge that crosses disciplinary boundaries. For example, a 2006 report by the National Institutes of Health (NIH) affirmed the agency’s commitment to lowering the “artificial organizational barriers” of the disciplines. According to the NIH, these traditional borders may in some cases “impede the pace of scientific discovery” (NIH, 2006).

Organizational strategies to foster interdisciplinary activity in higher education largely concentrate on structural barriers that traditionally divide the institution. Interdisciplinary strategies include campus-wide initiatives, new buildings for interdisciplinary use, research centers and institutes, seed funds for collaborative research projects, and faculty hiring policies, such as cluster hires or joint hiring procedures (Sa, 2007). Other approaches have a greater focus on the institutional culture—fostering a campus climate supportive of collaborative learning and research, providing faculty incentives such as tenure and promotion policies, and utilizing strategic plans to reinforce support of interdisciplinary activity (NAS, 2004).

Conceptual Framework

In their work on organizing for collaboration within higher education, Kezar and Lester (2009) draw on the Mohrman, Cohen, and Mohrman (1995) model of developing intra-organizational collaboration from the management literature. This model emphasizes the role of formal processes and a learning approach to how organizations foster collaboration. The focus on formal activity, such as mission development, training, and rewards, contrasts with the alternative view in the literature on collaboration. Most notably, the work of Kanter (1994) draws heavily on the importance of informal processes and relationships, as well as sense-making, to foster collaboration within institutions.

By applying the existing knowledge available within the corporate literature to higher education, Kezar and Lester (2009) provide a three-stage model to assess and understand collaboration within postsecondary institutions. Their work builds on the Mohrman et al. (1995) model by relying on assessment and learning as foundational elements. Each of the stages represents an evolution of institutional commitment in establishing and engaging to form an environment of collaboration. Table 1 highlights each stage and the key elements within each progressive level.

Table 1. *Kezar and Lester's 3 Stage Model of Collaboration in Higher Education*

Stage	Elements
Stage 1: Building Commitment to Collaborate	Values External pressure Learning
Stage 2: Commitment to Collaboration	Mission Networks Rewards
Stage 3: Sustaining Collaboration	Structure Rewards Resources Hiring Formalizing the network

The first stage of Kezar and Lester's model describes how institutional leaders build a commitment to collaborate by leveraging value systems, external pressure, and learning. Value systems provide a basis for putting collaboration in a larger context such as an institutional desire to be innovative. At this stage, leaders build a case in support of collaboration by utilizing supportive external entities and the campus network. The network in particular plays a key role in fostering learning by serving as a critical mass of individuals to communicate support for larger institutional moves to collaborate.

After building support for collaboration, the second stage in the process entails building from commitment to action. Critical in this step is the role of senior administrative leadership to demonstrate that collaboration is a priority both symbolically and substantively. Leaders use rewards and communication opportunities to convey the significance given to collaboration as a central institutional objective. This entails an alignment of the mission in favor of collaboration and mobilizing the campus network to serve as individual leaders actively moving to support a collaborative environment.

The third stage focuses on sustaining collaborative activity primarily through changes in larger organizational structures, processes, and design. Each of these is leveraged to support, solidify, and institutionalize the commitment for collaboration. Furthermore, these endeavors demonstrate to organizational members that the changes espoused in prior stages are not transitory, but rather a new core organizational purpose. This belief buoys the campus network to overcome barriers that may arise and leads to a redesign of key institutional systems and processes.

Research Methods

This study examines how interdisciplinary strategies at American research universities emerge, develop, and become institutionalized. Starting with a focus on research universities, two criteria were utilized to select the institutions for data analysis. First, only research institutions identified by the most recent Carnegie classifications as universities with a very high research activity are part of the sample. Ninety-six universities fit into this category. This classification included institutions that awarded the doctorate degree and exhibited significant

research/development expenditures across the disciplines. The Carnegie classifications do not specifically identify institutions that receive interdisciplinary research funding; such criteria were not an initial consideration in terms of the study sample. Analysis was restricted to those institutions that received at least \$300 million in federal research funding for fiscal year 2004 (the most recent data available, in Walters, 2006). Research and development expenditures in higher education are highly concentrated among a small number of institutions. The National Science Foundation (NSF) recognized 20 universities as the recipients of one-third of all federal research funding (NSF, 2006). The criterion resulted in 21 institutions, including all universities identified by the NSF. Half of these institutions are private; almost all have a medical school and are members of the American Association of Universities.

Table 2. *Universities Included in this Study*

1. Columbia University	12. University of Michigan
2. Cornell University	13. University of Minnesota
3. Duke University	14. University of North Carolina, Chapel Hill
4. Harvard University	15. University of Pennsylvania
5. Johns Hopkins University	16. University of Pittsburgh
6. Massachusetts Institute of Technology	17. University of Southern California
7. Pennsylvania State University	18. University of Washington
8. Stanford University	19. University of Wisconsin, Madison
9. University of California, Los Angeles	20. Washington University in St. Louis
10. University of California, San Diego	21. Yale University
11. University of Colorado	

To understand how major research universities engage in interdisciplinary activities, this study focuses on a textual analysis of institutional documents. The analysis allowed for an inference of meaning from a range of texts in regards to institutional behavior (Weber, 1990). The emphasis of document analysis is on the analysis of texts within the content of their use. Primary sources of institutional data included strategic plans, master plans, annual reports, presidential addresses, public news releases, mission statements, and major policy initiatives. Triangulation and integration was achieved through the use of multiple data sources. Documents were collected through publicly available websites and other electronic resources. An emphasis on formal organizational communications can provide insights into organizational approaches to management (Russ, 1991). Data analysis focused on documents that reflect the organizational reality of the institution. Such documents provided insight not only into the interdisciplinary activity at each university, but also hold significance and meaning to organizational members, allowing us to examine the commitment to interdisciplinary pursuits.

An inductive analysis was used to develop codes and categories from the data (Strauss & Corbin, 1998). Such an approach allowed the examination of patterns of meaning across the institutions. The researcher identified recurrent codes in the transcripts related to the concepts of interdisciplinarity, innovation, and translational research. During additional data collection, these codes were continuously revised. To increase reliability, a colleague separately coded the institutional documents, leading to renaming of the elements as necessary. This study's approach comes with some limitations. Additional data collection through interviews or

surveys to discover additional details on interdisciplinary activity on the campuses would add to the information in the institutional documents. Also, these additional data would increase the conclusions to be drawn about the substantive changes that occurred at each institution. This study focuses on interdisciplinary collaboration although, almost certainly, other types of collaboration take place at the universities examined.

Findings

This research highlights the range of evolving, complex organizational arrangements intended to foster collaboration. Through organized research centers or shifts in faculty hiring, these efforts remain largely on the outskirts of the disciplinary tradition in American higher education. Previous research (see, for example, Feller, 2004; Frost, Jean, Teodorescu, & Brown, 2004; Rhoten, 2003; and Sa, 2007) defines strategies by which research universities pursue collaboration and interdisciplinary activities. An inventory of strategies provides an important first step in understanding interdisciplinary pursuits; however, such efforts possess only limited ability to capture the broad and variegated responses according to unique institutional characteristics. The analysis of institutional documents from universities with very high research activity reveals numerous shared activities in pursuit and support of collaborative interdisciplinary activity. This approach demonstrates not only current practices, but provides insight into assessing and implementing strategies and policies in support of interdisciplinary collaboration.

Building a Commitment

Institutions that demonstrated efforts to engage in interdisciplinary activity frequently touted their “tradition” of innovative research and collaboration. Duke University included interdisciplinarity as one of the five “enduring themes” for the institution, and labeled it a “signature strategic advantage.” In a presidential speech, Richard Brodhead noted, “Duke has a culture of innovation and collaboration.” As the long-range plan of the University of Pittsburgh claims, “our most pressing task is to heighten our intellectual environment so that it is fully alive to the expression and the materialization of bold new ideas.” Efforts to support interdisciplinary collaboration described such work as integral to the institution.

Steve Sample, President of the University of Southern California, forcefully placed interdisciplinary initiatives at the heart of the university’s goals. He contended, “Many institutions talk about interdisciplinary teaching and research but few actually practice it. At USC we don’t do it perfectly, but we do it better than most.” Stanford University unveiled what it terms the Stanford Challenge, citing the “unique ability” of the institution to undertake multidisciplinary initiatives. “A core strength of Stanford is its ability to function as one university and not just a collection of separate schools and institutes,” noted a member of the institution’s Board of Trustees.

For such institutions, interdisciplinarity was not simply rhetoric as evidence of a collaborative culture. Rather, such efforts were integrated into the key components of the organization and provided a fundamental core of operation. These universities touted interdisciplinarity as part of their organization’s history. For example, the University of Pennsylvania’s institutional website described a “history of innovation in interdisciplinary education and scholarship.” In this context, institutional leaders leveraged the significance of the history as evidence of an innovative tradition and values system.

Moreover, the senior leadership of these institutions posited the centrality of interdisciplinarity in maintaining prominence. As Chancellor Marye Anne Fox of the University of California-San Diego clearly articulated, “Interdisciplinary scholarship is at the heart of the truly excellent research university. More and more frequently, solutions to the most challenging research problems require the collaborative talents of groups of investigators with a range of disciplinary skills.” In addition, the value of responding to societal needs and providing external benefit held was cited. The nexus of these priorities was portrayed by Yale President Richard Levin: “we have the opportunity to become one of the national centers of excellence in many of the emerging growth areas ... There’s no doubt our strengths in these areas could benefit the local and regional economy.”

By linking internal activity to broader societal benefits, university leaders leveraged support for interdisciplinary initiatives. In its annual research report, Pennsylvania State University described how its faculty are “solving the complex problems of our common future—from developing renewable energy to improving homeland security” through interdisciplinary collaborations. Similarly, presidential addresses by Massachusetts Institute of Technology President Susan Hockfield envision “a new era of collaboration ... that will surely be the hallmark of the decades ahead.” She also contends, “Our task now is to intensify the creative relationships we have already built with the knowledge-based economy—to create new, connected models.” The Stanford Challenge explained that “The role of universities in addressing the world’s most pressing challenges has become increasingly important as the issues facing scientists and scholars have grown more complex and global,” while , “at the same time, budget limitations and market realities have caused government and industry efforts to diminish, leaving universities to fill the gap.” These institutions frequently sought to equate interdisciplinary collaboration with innovation. University leaders attempted to tie internal goals, values, and beliefs to external needs to foster a commitment among institutional constituencies to support interdisciplinary initiatives and activities.

Implementing a Commitment

Key institutional administrators exhibited great influence in implementing the espoused support of interdisciplinarity. The president or provost played a critical role in the development of interdisciplinary initiatives, referring to such efforts as a crucial element of the institution. This component conforms to existing notions regarding thriving interdisciplinary strategies, noting the need for administrative support and leadership to ensure success (Lattuca, 2001; Sa 2007). For example, Chancellor James Moeser of the University of North Carolina at Chapel Hill contextualizes his vision for interdisciplinarity as follows: “Only a truly great university can bring all the resources needed to examine [interdisciplinary] issues from all perspectives. We intend to be that university.” Duke’s Brodhead emerged as a symbolic and cultural advocate of interdisciplinary efforts on campus, proclaiming, “The intellectual landscape of our future will be one of ongoing disciplinary revisions, recombinations, and collaborations that will require a highly flexible, improvisational cast of mind.”

Prioritizing interdisciplinarity through the institution’s strategic plan served as the most common avenue for attempting to implement and support such activity. For example, the Penn Compact, a strategic plan envisioned by President Amy Gutmann, prioritized “the integration of knowledge from different disciplines and professional perspectives in research and teaching.” The University of Colorado also noted that the support for interdisciplinary research was

related to its mission as a public institution. The University of Minnesota echoed similar themes by identifying interdisciplinary areas that allow the university “to leverage the breadth and particular strengths” of the institution. These emphases, according to the president, “represent areas of comparative advantage for the university, have high quality foundational programs, are central to the ... land grant mission ... and reflect the needs and resources of Minnesota.”

In addition to including interdisciplinary initiatives in strategic plans, universities identified these values as part of their mission. The University of California-San Diego, in its mission statement, noted “an interdisciplinary ethos and tradition of innovation and risk-taking” as underlying its “research strength and ability to recruit top students and scholars.” As further evidence, the university developed a program to create “collaboratories.” This grant program sought to create a financially risk-free environment to foster collaboration across the disciplines. The institution’s annual report concluded, “The key to significant scientific breakthroughs in the 21st century is the ability to amass considerable, diverse talent in a broad spectrum of disciplines,” and further noted the benefits of “collaborative talents of groups of investigators with a range of disciplinary skills.” Pennsylvania State University echoed this sentiment, touting the need to “further enhance opportunities for interdisciplinary and cross-campus collaborations” as fundamental to the institution’s mission. Derek Bok, the former President of Harvard University, reflected on interdisciplinary activities as a “healthy development” for the institution. But such traditions were measured against other organizational priorities and strategies. Bok tempered his statements by noting, “Growth in interdisciplinary science needs to be carefully planned, in order to fit well with our important, ongoing efforts in the traditional scientific disciplines... [with] necessary guidance and oversight.” Interdisciplinary research and engagement was often identified as one of numerous organizational priorities. However, the inclusion of collaboration along with traditional goals provides evidence of success of efforts to publicly support the commitment to this kind of engagement.

Sustaining Collaboration

The challenge for many collaborative initiatives rests in sustaining and institutionalizing activities. Institutions in this study exhibit a variety of strategies in an effort to sustain interdisciplinarity. Structural strategies employed by universities included efforts to eliminate barriers that prohibited collaboration or to create functional units to support interdisciplinary teams. The strategic plan at the University of Colorado defined the need to create “nimble and adaptable administrative structures” to support interdisciplinary collaborations. The strategies to restructure or reorganize the university were the most prevalent across the institutions and levels of interdisciplinary activity present.

Financial and human resource initiatives as part of its interdisciplinary efforts included the hiring of interdisciplinary faculty and the organization of an interdisciplinary structure within the institution. Tenure and promotion policies were re-evaluated to focus on challenges associated with interdisciplinary research. Cluster faculty hires as part of larger efforts to support collaboration served as a common human resource strategy. The University of Wisconsin initiated a cluster hiring policy to employ researchers who span departments and colleges in an effort to “remain at the forefront of research.” The strategic plan identified “increased resources and improved infrastructure for research/creative work” as an institutional priority, noting that interdisciplinary/strategic hiring was the primary means to accomplish this effort.

The strongest display of sustaining commitment by universities with extensive interdisciplinary engagement was evident through the construction of interdisciplinary facilities. Physical space and financial resources, valuable commodities for any university, were provided to support interdisciplinary initiatives. This approach highlights the need not only for social space to foster collaboration, but also physical space. Through the institutional master plan, these universities explicitly defined the need for flexible research facilities and an interdisciplinary infrastructure, one that fostered engaged social interaction among researchers. As part of this commitment to interdisciplinary facilities, campus buildings devoted to such research were common on these campuses. As Cornell University's master plan describes, "Growth on campus in the last several decades has been characterized by increasing interdisciplinary collaboration ... and thinking innovatively about connecting academically and physically across an expanding campus." Construction to support research growth was a capital priority of the University of Pittsburgh through its long range plan, "as the body of human knowledge expands, research space must readily adapt to societal needs and the availability of research funding." The creation of an interdisciplinary facility is typically predicated on the existence of an organizational structure as well as interdisciplinary teams to support the design, implementation, and financial support for such a substantial and expensive endeavor. For example, Massachusetts Institute of Technology made the creation of space a central tenet of its interdisciplinary strategy—the university argued that the investment in facilities can literally construct and foster an interdisciplinary community. The institutional documents from MIT consistently referred to "building the culture into the architecture." As defined through the institutional strategic plan, the physical goal of such efforts was to "provide an infrastructure for 21st century research that supports inventiveness, energy, and excellence of MIT's students, faculty, and staff." The President Emeritus, Charles Vest, claimed in 2002, "the buildings on this extraordinary campus should be as diverse, innovative, and audacious as the community they support." For the institutions in this study, the creation of physical space served as an example of the sustainability of interdisciplinary collaboration activities.

Discussion

The institutional documents of these research universities reveal a variety of approaches toward interdisciplinary collaboration and efforts to support such work. Particularly significant is the role of administrative leaders in developing and fostering a belief system in support of interdisciplinary collaboration. Administrators use symbolism, language, and rituals to stir action attuned to institutional goals, values, and norms (Pfeffer and Salancik, 1978). Presidents and provosts served as key leaders in setting the language in support of interdisciplinary collaboration. By describing interdisciplinarity as central to the institution, these leaders sought to instill institutional priorities in favor of collaboration. Indeed, many described interdisciplinary research and teaching as necessary to maintain the institution's position as a leading national research university. This leadership role proves significant as "management's effect is primarily with respect to expressive or symbolic actions; management has less, although still some, discretionary impact on instrumental action" (Pfeffer, 1981, p. 5). As a result, senior administrators can play a pivotal function in fostering this type of activity. March (1989) argues, "decision making is a highly contextual, sacred activity, surrounded by myth and ritual, and as much concerned with interpretive order as with the specifics of particular choices" (p. 14). A significant aspect of leadership for collaboration consists of the management of myths, symbols, and images. Certainly campus leaders influence institutional activity; however, the link between the symbolic and substantive may more accurately be described as loosely coupled (Weick,

2001). Senior administrators lead structural or financial changes, but their greatest influence rests in creating a supportive environment.

To encourage this culture, a significant avenue for leadership to develop shared beliefs is through the use of language. A shared language facilitates socialization, as well as communicating and establishing cultural signifiers (Barker & Galasinski, 2001). Administrators also use language to provide symbolic rather than substantive outcomes for those not directly involved in decision-making processes (Edelman, 1985). For example, some faculty and programs receive tangible benefits such as additional resources to collaborate, while others are mollified with symbolic language and rituals about the role of collaboration in the university. Analyses of symbols and language “can trace the integration and disintegration of organizations and sets of organizations, as well as providing information on the use of various symbols over time and across contexts” (Pfeffer, 1981, p. 26).

In an effort to move an organization forward, research university leadership functions to make institutional activity meaningful and sensible to participants. More than simply helping members make sense of an activity, research university leaders develop a consensus; thus, legitimizing internal efforts with external constraints from the environment serves as the primary goal. Supporters of collaboration tied results from interdisciplinary pursuits to solving broader societal problems, increasing external relevance, and growing resources. Indeed, these efforts extend to the larger social context with the need to legitimize organizational processes and outcomes (Dowling and Pfeffer, 1975). Demonstrating to the campus the importance of collaboration as an internal activity and meeting larger societal objectives can help generate external support from government and industry. Institutional leaders mitigate these interactions through the use of symbolism, which fosters support among organizational members. As a result, collaboration becomes necessary for both internal and external stakeholders to fulfill the university’s mission and goals.

External governmental funding priorities and the need to solve complex societal problems in part serve as the impetus for interdisciplinary activities. Almost all of the universities in this study demonstrated similar organizational responses to these larger influences. These influences, as reflected in the strategies, display a shared social norm across the universities, suggestive of isomorphic tendencies that create common policies and procedures across multiple institutions. The challenge for research universities rests in developing policies consistent with the organizational field, which value innovation and are considered “cutting edge.” Institutions leverage these elements to align strategies with the broader organizational field and local cultural elements. As such, collaboration efforts that are isolated within a single college, or led by a small group of faculty, can have little impact in terms of broad, institutional behavior. The universities that placed the strongest emphasis on an interdisciplinary culture identified such work as a core, fundamental element of their operation.

Conclusion

Interdisciplinary activity serves an increasingly significant role in the research practices of American research universities. The findings of this study demonstrate how interdisciplinary collaboration emerges, develops, and becomes institutionalized through a variety of formal and informal strategies. In addition, the findings further the work of Kezar and Lester looking across institutions at a specific form of organizational collaboration. The strategies examined, identified

across the universities, appear remarkably similar to those identified in Kezar & Lester's 2009 collaboration framework.

This study's review of institutional records showed strategies research universities used to foster collaboration and interdisciplinary work on campus. A central policy question for institutional leaders rests in how to encourage a supportive culture to complement collaborative priorities and goals. Almost all of the research universities in this study demonstrated evidence of behavior responsive to broader social influences in support of interdisciplinary activity. Moreover, beliefs regarding the centrality of interdisciplinarity and collaboration for research universities can serve as a critical driver of institutional rhetoric and activity. The institutional documents examined in this research displayed the influence of the external environment's interdisciplinary priorities. To compete for significant federal grants, as an example, these universities deemed institutional strategies in support of interdisciplinary collaboration as necessary. The language demonstrated a shared norm across the range of universities that manifested as common policies and procedures. The institutions in this study coupled external pressures to solve societal problems with their own internal values supporting collaboration. Many of the formal activities and strategies universities employed, such as breaking down administrative barriers or cluster hiring policies, were reflective of these values.

By establishing a commitment to collaboration, university leaders enable organizational networks to mobilize support and overcome well-known barriers to sustaining collaboration. These findings show the importance of establishing this commitment before engaging in strategies ostensibly designed to continue and expand these partnerships across campus. A variety of internal and external forces increasingly call for collaboration generally and interdisciplinary activity specifically. This study examined the ways research universities engage in this work and presented possible strategies for institutions to support and implement interdisciplinarity and organizational collaboration.

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